Exascale Co-Design Center for Materials In Extreme Environments

One of Three DOE/SC/ASCR Co-Design Centers

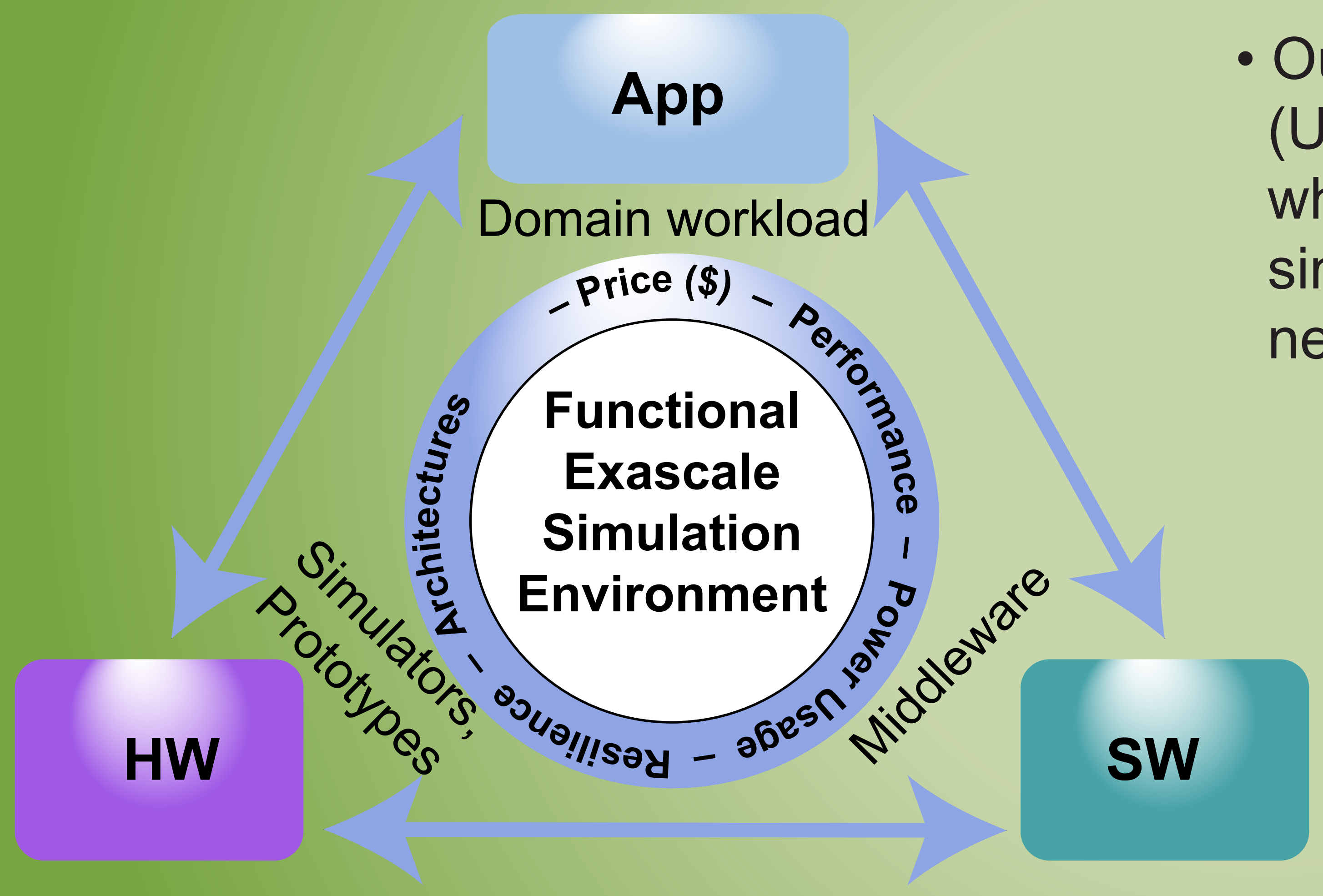
ExMatEx

Los Alamos NATIONAL LABORATORY EST 1943 | Lawrence Livermore National Laboratory | OAK RIDGE National Laboratory | STANFORD UNIVERSITY | Sandia National Laboratories | CALIFORNIA INSTITUTE OF TECHNOLOGY

Large-scale collaboration between National labs, industry, and academia

Goal is to establish relationship between algorithms, software stack, and architectures to enable exascale-ready materials science applications in ~2020.

Exploit hierarchical, hetereogeneous architecture to achieve more realistic large-scale simulations with adaptive physics refinement.



- Our vision is an uncertainty quantification (UQ) driven adaptive physics refinement in which meso- and macro-scale materials simulations spawn micro-scale simulations as needed.

This task-based approach leverages the extensive concurrency and heterogeneity expected at exascale while enabling fault tolerance within applications.

The programming models and approaches developed to achieve this will be broadly applicable to a variety of multiscale, multiphysics applications, including astrophysics, climate and weather prediction, structural engineering, plasma physics, and radiation hydrodynamics.

Executive Advisory Board
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SC/ASCR

Exascale Ecosystem

Advanced Algoritms & Co-Design "Code-Team"
Lead: David Richards (LLNL), Erick Draeger (LLNL), Jamal Mohd-Yusof (LANL), Danny Perez (LANL)

Computer Science
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